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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,343	08/31/2006	Masaru Sasaki	295715US26PCT	9501
22850 7590 08/04/2009 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER MALEK, MALIHEH				
ART UNIT 2813		PAPER NUMBER		
NOTIFICATION DATE 08/04/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/591,343

Applicant(s)

SASAKI ET AL.

Examiner

MALIHEH MALEK

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2009.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7 and 8 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4 and 7-8 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 08/31/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the communication filed on 05/14/2009. Claims 1-4 and 7-8 are pending in this application. Applicant submitted a declaration under 37 C.F.R. §1.131 to overcome the references-of-record and to change the effective priority date to November 22, 2002.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: (***See MPEP Ch. 2141***)

- a. Determining the scope and contents of the prior art;
- b. Ascertaining the differences between the prior art and the claims in issue;
- c. Resolving the level of ordinary skill in the pertinent art; and
- d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal (Pat. No.: US 6,699,777 B2) in view of Verhaverbeke et al. (Pat. No.: US 7,159,599 B2), herein Verhaverbeke.

Regarding claim 1, Agarwal teaches a method for manufacturing a prescribed semiconductor device by forming a film mainly formed of tungsten and a film of a component different from the film mainly formed of the tungsten on a semiconductor substrate, comprising: forming a first layer 108, which is formed of the film of the component different from the film mainly formed of the tungsten, on the semiconductor substrate; forming a second layer 112, which is formed of the film mainly formed of the tungsten, on the semiconductor substrate; and forming an oxide film 115/118 on an exposed surface of the first layer by plasma processing using a process gas containing oxygen gas and hydrogen gas (col. 2, lines 30-40 & 62-65, col. 3, lines 50-61, and Fig. 5).

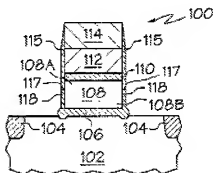


FIG. 5

Regarding claim 1, Agarwal does not expressly teach a plasma processing at a process temperature of 300°C or more and at a flow rate ratio

(hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less.

In the same field of endeavor, regarding claim 1, Verhaverbeke teaches a plasma oxidation process comprising a process temperature of 300°C or more and at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less to provide a hydrogen rich mixture (col. 28, lines 30-31 and col. 39, lines 43-55). In any case, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed flow rate ratio range. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, *In re Aller*, 105 USPQ 233 (CCPA 1955). The claim(s) is(are) obvious without showing that the claimed range(s) achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within

skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the flow rate ratio of the Verhaverbeke for the method of Agarwal to provide a hydrogen rich mixture in the oxidation process.

Regarding claim 2, Agarwal teaches a method for manufacturing a semiconductor device wherein the semiconductor device is a transistor, and a gate electrode is formed of the first layer and the second layer (Fig. 5 and col. 1, lines 5-13).

Regarding claim 3, Agarwal teaches a method for manufacturing a semiconductor device wherein the second layer is a tungsten layer or a tungsten silicide layer (col. 2, lines 32-33).

Regarding claim 4, Agarwal teaches a method for manufacturing a semiconductor device where the first layer is a silicon layer (col. 2, lines 32-33).

Regarding claim 7, Agarwal teaches a method for plasma oxidation of a film 108 of a component different from a film mainly formed of tungsten of a semiconductor substrate on which the film 112 mainly formed of the tungsten and the film 108 of the component different from the film mainly formed of the tungsten are formed, comprising: forming an oxide film 115/118 on an exposed surface of the film of the component different from the film mainly formed of the

tungsten by plasma processing using a process gas containing oxygen gas and hydrogen gas (col. 2, lines 30-40 & 62-65, col. 3, lines 50-61, and Fig. 5).

Regarding claim 7, Agarwal does not expressly teach a plasma processing at a process temperature of 300°C or more and at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less.

In the same field of endeavor, regarding claim 7, Verhaverbeke teaches a plasma oxidation process comprising a process temperature of 300°C or more and at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less to provide a hydrogen rich mixture (col. 28, lines 30-31 and col. 39, lines 43-55). In any case, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed flow rate ratio range. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, *In re Aller*, 105 USPQ 233 (CCPA 1955). The claim(s) is(are) obvious without showing that the claimed range(s) achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and

unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the flow rate ratio of the Verhaverbeke for the method of Agarwal to provide a hydrogen rich mixture in the oxidation process.

Regarding claim 8, Verhaverbeke teaches a plasma oxidation method, wherein the plasma is excited by a microwave to energize the gases (col. 7, lines 15-36, col. 16, lines 42-45).

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MALIHEH MALEK whose telephone number is (571)270-1874. The examiner can normally be reached on Mon-Fri, 8:30-6pm ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Landau can be reached on (571)272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 27, 2009

/M. M./
Examiner, Art Unit 2813

/W. David Coleman/
Primary Examiner, Art Unit 2823